## AMENDMENTS

**In the Claims:**

1. (Currently amended) A method for determination of transmission behavior of an optical waveguide by ray tracing, comprising:

undertaking a spatial representation of the optical waveguide as an overlapping spatial combination of two or more guide pieces with an analytically representable surface, for which in each case an analytical method for determination of intersection points of a spatial straight line with the surface is produced; and

determining the transmission behavior by the ray tracing of a test ray, intersection points of the test ray with the surface of the guide pieces until such time as an intersection point is found which belongs to a real material transition.

2. (Previously presented) The method according to claim 1, wherein the determination as to whether a real material transition is present comprises:

initially determining intersection points of the test ray with the surfaces of guide pieces;

sorting the intersection points in ascending order of ray direction and investigated in the order, starting from an origin;

if the origin is located outside the optical waveguide, finding the first intersection point as one with a real material transition;

if the origin is not located outside the optical waveguide, the angle between a normal to the surface of an associated waveguide section and ray direction is used to determine whether an entry or exit is present in the guide piece; and

determining a real material transition is present if an intersection point is reached in which, for each entry in a part piece, an exit has also occurred with predetermined entries initially being set in accordance with the position of the origin.

3. (Previously presented) The method according to claim 1, wherein the determination as to whether a real material transition is present comprises:

initially determining intersection points of the test ray with the surfaces of guide pieces;

sorting the interfaces in ascending order of ray direction and investigated in the order, starting from an origin;

if the origin is located outside the optical waveguide, finding the first intersection point as one with a real material transition;

if the origin is not located outside the optical waveguide, for each intersection point one further test point in each case in a direction of the ray and opposite to a direction of the ray is investigated as to whether it lies inside one of the part pieces; if the result is different for the two test points, a material transition is present.

4. (Previously presented) The method according to claim 1, wherein the determination as to whether a real material transition is present comprising:

determining successively, for the guide pieces intersection points of the test ray with the surface of the guide piece, and investigated with the subsequent steps;

determining, for each intersection point one test point in each case in a same direction and in an opposite direction to the ray, with a small predetermined distance from the intersection point; and

investigating each of the test points to see whether it lies inside one of the part pieces; if the result is different for the two test points, a material transition is present.

5. (Previously presented) The method according to claim 3, wherein

normals to the surface are used to determine the direction in which there is an exit from the part piece and a test point is determined in the direction; if it does not lie within another guide piece, a material transition is present.

6. (Previously presented) The method according to claim 1, with the determination as to whether a real material transition is present comprising:

initially determining intersection points of the test ray with the surfaces of guide pieces are determined;

sorting the interfaces in ascending order of ray direction and investigated in order, starting from an origin; and

determining, for each intersection point, whether it lies inside one of the other part pieces; if not the case, a material transition is present.

7. (Previously presented) A device for simulation of optical waveguides, where the device performs the following:

undertaking a spatial representation of the optical waveguide as spatial combination of two or more guide pieces with an analytically representable surface, for which in each case an analytical method for determination of intersection points of a spatial straight line with the surface is produced; and

determining the transmission behavior by the ray tracing of a test ray, intersection points of the test ray with the surface of the guide pieces until such time as an intersection point is found which belongs to a real material transition.